

**REMARKS**

**I. Formalities**

Applicant notes that the Examiner did not indicate whether the Formal Drawings filed on January 27, 2000 are accepted. Applicant respectfully requests that the Examiner acknowledge and approve the aforementioned Formal Drawings.

**II. Status of the Application**

As an initial matter, Applicant notes that the Examiner has not presented any detailed grounds of rejection with respect to claims 115-116, nor has the Examiner addressed claims 115-116 in the grounds for restriction under 35 U.S.C. § 121.

By the present amendment, claims 1, 3, 78, and 106 have been amended. Claims 1, 3, 5, 7, 9, 10, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 71, 73, 77, 78, 93-105 are pending in the application, with claims 1, 3, and 13 being in independent form. Claims 1, 3, 5, 7, 9, 10, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 71, 73, 77, 78 and 93-105 have been rejected and claims 106-114 have been withdrawn from consideration. The present amendment addresses each point of objection and rejection raised by the Examiner. Favorable reconsideration is respectfully requested.

**III. Allowable Subject Matter**

Applicant thanks the Examiner for allowing claims 13, 15, 17, 57, and 59.

**IV. Response to Restriction Requirement**

The Examiner alleges that claims 106-114 are directed to an invention that is independent or distinct from the invention originally claimed. Specifically, the Examiner alleges that claims

106-114 and the original claims are distinct sub-combinations, which are useable together in a single combination. Further, the Examiner asserts that the allegedly distinct sub-combination disclosed in claims 106-114 is directed to a color filter, which is usable with DLPs.

Thus, the Examiner alleges that restriction to either the original claims or to claims 106-114 is required under 35 U.S.C. § 121. Further, the Examiner indicates that the original claims have been constructively elected by original presentation for prosecution on the merits. Hence, the Examiner has withdrawn claims 106-114 from consideration as being directed to a non-elected invention. Applicant respectfully traverses this restriction requirement for *at least* the reasons stated below.

The original claims and claims 106-114 are not directed to distinct sub-combinations. To the contrary, claims 106-114 recite features similar to those originally claimed in claims 1 and 3, but recite these features in a different manner. That is, claims 106-114 are merely alternative expressions directed to the same inventive subject matter recited in the original claims. By way of illustration, similar to original claims 1 and 3, claims 106-114 recite features depicted, for example, in Figures 1 – 2I of the present application. Moreover, MPEP § 803 states that “an application may be required to be restricted to one of two or more claimed inventions only if they are able to support separate patents and they are either independent or distinct.” Therefore, because claims 106-114 are directed to the same inventive subject matter recited in the original claims, the aforementioned restriction requirement is improper for *at least* these reasons.

The MPEP further mandates that if the search and examination of an entire application can be made without serious burden, the examiner must examine it on the merits. Accordingly, any requirement for restriction must make a *prima facie* showing that a serious burden exists to

examining claims 106-114. In the Office Action, the Examiner makes no showing that there would be a serious burden to examining claims 106-114. The mere conclusory allegations that claims 106-114 are directed to a distinct sub-combination with a separate utility such as DLPs, without any evidentiary support or explanation whatsoever, even if assumed to be true (and Applicant firmly submits they are not), do not support a showing of a serious burden.

**V. Claim Rejections - 35 U.S.C. § 101**

The Examiner has rejected claims 1, 3, 5, 9-10, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 71, 73, 77, 78 and 93-105 under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter (i.e., nothing more than a mathematical formula). For *at least* the reasons herein, Applicant respectfully submits that the claims recite statutory subject matter. Accordingly, withdrawal of the rejection under 35 U.S.C. § 101 is respectfully requested.

According to MPEP §706.03(a), “a scientific principle, divorced from any tangible structure, can be rejected as not within the statutory classes.” (emphasis added) *citations omitted*. However, MPEP §2106 makes clear that this exclusion from statutory subject matter is narrowly limited to scientific principles and mathematical algorithms in the abstract. *See also AT&T Corp. v. Excel Communs., Inc.*, 172 F.3d 1352, 1356 (Fed. Cir. 1999). In fact, “[a] claim drawn to subject matter otherwise statutory does not become non-statutory simply because it uses a mathematical formula.” Diamond v. Diehr, 450 U.S. 175, at 187 (1981). To the contrary, a mathematical algorithm may be an integral part of patentable subject matter such as a machine or process if the claimed invention as a whole is applied in a "useful" manner. *See* MPEP §2106, AT&T Corp., 172 F.3d at 1357. Indeed, “it is irrelevant that a claim may contain, as part of the

whole, subject matter which would not be patentable by itself" (e.g., a mathematical formula in the abstract). State St. Bank & Trust Co. v. Signature Fin. Group, 149 F.3d 1368, 1375 (Fed. Cir. 1998).

Both independent claims 1 and 3 recite a novel optical modulation element comprising a liquid crystal layer having a helix pitch, a white light source, and at least one flat mirror arranged in a new and useful configuration such that a selected wavelength  $\lambda$  is selectively reflected. Thus, there is a structure to the claims, as supported by the drawings and specification disclosing the present invention. Therefore, Applicant submits that a new and useful structure (e.g., new and useful optical modulation element from which a selected wavelength range is selectively reflected) is claimed, and not an abstract mathematical formula.

In addition, both independent claims 1 and 3 recite "wherein said selected wavelength  $\lambda$  is determined by selecting at least one of the incident angle  $\theta$  and the helix pitch  $p$ , in accordance with the relationship  $p \cdot \cos\theta = \lambda/n$ ." Accordingly, claims 1 and 3 apply the mathematical relationship  $p \cdot \cos\theta = \lambda/n$  in a new and useful way.

Furthermore, in AT&T Corp. Excel Communications, 50 USPQ2d 1447, 1452 (Fed. Cir. 1999), claims that contained mathematical algorithms were held to be patentable subject matter, as use of the algorithm did not preempt other uses of the mathematical principle. Similar to the AT&T case, the presently claimed invention is directed to a novel application of mathematical principles to produce a useful, concrete, tangible result. Moreover, Applicant respectfully submits that the presently claimed invention does not pre-empt other uses of the mathematical principle itself.

Thus, Applicant respectfully submits that the application of portions of MPEP § 2106 and the case law that are directed to treatment of abstract mathematical formulas are not applicable to this application. Accordingly, Applicant respectfully submits that the rejections under 35 U.S.C. § 101 should be withdrawn, and claims 1, 3, 5, 9-10, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 71, 73, 77, 78 and 93-105 should be allowed.

**VI. Claim Rejections - 35 U.S.C. § 102**

The Examiner rejected claims 1, 3, 5, 9-10, 19, 21, 23, 25, 27, 33, 35, 45, 47, 49, 51, 53, 55, 71 and 73 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,841,496 to Itoh, *et al.* (hereinafter “Itoh”). Applicant respectfully traverses this rejection for *at least* the reasons stated below.

Independent claims 1 and 3 require that a light beam having a selected wavelength  $\lambda$  is selectively reflected from the liquid crystal layer, wherein said selected wavelength  $\lambda$  is determined by selecting at least one of the incident angle  $\theta$  and the helix pitch  $p$ , in accordance with the relationship  $p \cdot \cos\theta = \lambda/n$ . However, Itoh neither discloses nor suggests this requirement. In fact, Itoh discloses quite the opposite—a colorless display, describing coloration induced by the liquid crystal as the problem to be solved. *See* column 3, line 45 to column 4, line 52. Furthermore, the coloration disclosed in Itoh does not result from a selected wavelength range which is selectively reflected. To the contrary, the coloration disclosed in Itoh is a byproduct of utilizing double refractivity. In other words, the variations in color that are disclosed in Itoh are interference colors. Itoh would regard such wavelength-selective reflection as unwanted coloration to be eliminated. *See e.g.*, Itoh’s Background of the Invention.

Further, the Examiner has not provided any response whatsoever to Applicant's arguments that Itoh fails to disclose or suggest that at least one flat mirror reflects incident light transmitted through the liquid crystal layer toward the light source, as required by claim 1. Specifically, the mirror disclosed in Itoh directs incident light toward a viewer, not the light source, and there is a 20° difference between the direction of the light source and the direction of the viewer, and the viewing angle has ±10°. *See* column 5, lines 21-30. As a result, Applicant's arguments remain unrebutted for *at least* the reasons already of record.

Similarly, the Examiner has failed to provide any response whatsoever to Applicant's arguments that Itoh does not teach or suggest a first flat mirror to reflect the incident light transmitted through the liquid crystal layer in an incident direction thereof, or a second flat mirror for reflecting the light reflected by the first flat mirror and by the liquid crystal layer in the incident direction thereof, as required by claim 3. In particular, as disclosed in Itoh, neither the reflecting surface, nor the second surface which the Examiner argues is inherently a second reflector, is intended to reflect light back in the incident direction (*i.e.*, back in the direction from which it came). Accordingly, Applicant's arguments remain unrebutted for *at least* the reasons already of record.

Thus, Applicant respectfully submits that independent claims 1 and 3 are not anticipated by (*i.e.* is not readable on) Itoh for *at least* these reasons. Further, Applicant respectfully submits that the dependent claims 5, 9-10, 19, 21, 23, 25, 27, 33, 35, 45, 47, 49, 51, 53, 55, 71 and 73 are allowable *at least* by virtue of their dependency on claims 1 and 3 respectively.

**VII. Rejection under 35 U.S.C. § 103(a)**

Claims 7, 29, 31, 37, 39, 41, 43, and 93-105 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Itoh. Applicant respectfully traverses this rejection for *at least* the reasons stated below.

Claims 7, 29, 31, 37, 39, 41, 43, and 93-105 incorporate all the novel and nonobvious features of their base claims 1 and 3 respectively. As set forth above, Itoh fails to disclose or suggest all the features of independent claims 1 and 3. Furthermore, one of ordinary skill in the art would not have been motivated to modify the device taught in Itoh to selectively reflect a light beam having a selected wavelength  $\lambda$  from the device, wherein said selected wavelength  $\lambda$  is determined by selecting at least one of the incident angle  $\theta$  and the helix pitch  $p$ , in accordance with the relationship  $p \cdot \cos\theta = \lambda/n$ . Accordingly, Applicant submits that claims 1 and 3 are patentable over Itoh for *at least* these reasons. In addition, Applicant submits that the dependent claims 7, 29, 31, 37, 39, 41, 43, and 93-105 are allowable *at least* by virtue of their dependency on claims 1 and 3. Therefore, Applicant respectfully requests that the Examiner withdraw this rejection.

**VIII. Conclusion**

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

**Amendment Under 37 C.F.R. § 1.116**  
**U.S. Serial No. 09/492,231**

**Attorney Docket No.: Q57674**

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

Andrew J. Taska  
Andrew J. Taska  
Registration No. 54,666

SUGHRUE MION, PLLC  
Telephone: (202) 293-7060  
Facsimile: (202) 293-7860

WASHINGTON OFFICE  
**23373**  
CUSTOMER NUMBER

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